Unusual presentation of more common disease/injury

Simultaneous intracerebral haemorrhages; which came first, the supra-tentorial or the infra-tentorial one?

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Summary

The occurrence of simultaneous spontaneous non-traumatic hypertensive intracerebral haemorrhages (ICHs) is a rare event that carries a considerable morbidity and mortality. These haematomas constitute 0.7–2% of all hypertensive ICHs. We report a 42-year-old man with ischaemic heart disease who presented with sudden severe pancephalic headache, repeated vomiting and left-sided weakness. His work-up revealed two right-sided ICHs: putamenal and cerebellar.

BACKGROUND

This form of haemorrhagic stroke is rarely encountered clinically. Emergency room physician and vascular neurologists should be aware of this problem where the role of medical treatment and/or surgical intervention is still vague and leaves us confused in the midst of this brain chaos.

CASE PRESENTATION

A 45-year-old man was brought to our accident and emergency department with a 2-h history of severe pancephalic headache, repeated vomiting and left-sided weakness. The patient was drowsy but very irritable and shouting for pain relief. His blood pressure was 230/130 mm Hg with a regular pulse rate of 110 beats/min. There was severe instability of stance and gait; the patient was unable to sit or stand without support. His speech was slurred but understandable and there was a rightward jerky nystagmus. He demonstrated left-sided weakness of grade one, areflexia and extensor planter. The patient's younger brother said that the patient's blood pressure had always been high for the last 15 years. The patient underwent coronary angioplasty and stenting of the proximal descending and right coronary arteries less than 2 years ago. His medications were bisoprolol, lisinopril, atorvastatin and aspirin. The family denied head trauma, warfarin use or clopidogrel co-ingestion. They also stated that the patient's father and mother died suddenly when they were young and that his older brother died of massive subarachnoid haemorrhage when he was 39 years old. A non-contrast brain CT scan revealed two right-sided intracerebral haemorrhages (ICHs): putamenal and cerebellar (figure 1–2).

INVESTIGATIONS

The routine blood tests were unremarkable and the partial thromboplastin time and activated partial thromboplastin time were within their normal reference range. His total cholesterol at the time of admission was 210 mg/dl and low-density lipoprotein was 123 mg/dl.

TREATMENT

The patient's blood pressure was lowered gradually over 1 day to 150/90 mm Hg using intravenous labetalol and intravenous tramadol was used as a painkiller. Intravenous metochlopramide lessened the vomiting.

OUTCOME AND FOLLOW-UP

The patient's headache gradually resolved over 1 week and his blood pressure was maintained below 130/80 mm Hg with multiple antihypertensive medications. By the end of day 5, his drowsiness was mild and his left-sided severe weakness and instability of stance and gait persisted without any improvement (figure 3–4).

DISCUSSION

ICH is one of the most deadly stroke subtypes and accounts for 10–15% of all strokes. It is the second most common subtype of stroke; it is second to ischaemic stroke in frequency.^{1–3} The list of causes of non-traumatic ICH is long, but chronic hypertension ranks first on this list and comprises at least 50% of the causes; it is the most important potentially modifiable risk factor for this devastating vascular event.^{4–7}

Thrift *et al* studied 331 consecutive patients with haemorrhagic stroke and found that chronic hypertension more than doubled the risk of developing ICH.⁸ Chronic arterial hypertension results in a necrotising type of arteriopathy with fibrinoid degeneration and lipohyalinosis, and gradually ends in the formation of Charcot-Bouchard micro-aneurysms. The sudden rupture of these micro-aneurysms results in ICH. These changes predominantly affect the territory of penetrator arteries that branch off major intracerebral arteries often at 90° with the parent vessel; lenticulostriates, thalamoperforators, superior cerebellar and paramedian branches of the basilar artery are the usual targets.⁹ Approximately 80% of all ICHs occur in the supratentorial area, while the rest (20%) develop infratentorially.¹⁰

Figure 1 Non-contrast brain CT scan of the patient that was done 30 min after accident and emergency admission. There are right-sided putamenal and deep cerebellar haemorrhages. Note that the haematomas are not surrounded by oedema; this is a very early presentation.

Figure 2 Brain CT scan of the same patient at the level of the basal ganglia (upper panel) and lower midbrain (lower panel). The patient came to accident and emergency 1 h after developing severe headache and repeated vomiting; note the absence of peri-haematoma oedema.

Figure 3 Brain CT scan without contrast 5 days after admission. Note that there is mild oedema surrounding the putamenal haematoma and that the haematoma border is starting resolution. There is no hydrocephalus or blood inside the ventricles.

According to Weisberg *et al*,¹¹ the most common sites of primary ICH (in order of decreasing frequency) are the putamen and adjacent internal capsule (which comprises 50% of cases); the central white matter of the temporal, parietal or frontal lobes (lobar haemorrhages); the thalamus; a cerebellar hemisphere and the pons.

Our patient developed simultaneous right-sided putamenal and deep cerebellar haemorrhages. Adams and Victor¹² found that such simultaneous ICHs occur in 2% of all primary spontaneous hypertensive ICHs. However, Tanno *et al*¹³ studied 679 cases of hypertensive ICH and found that 0.7% of their patients presented with simultaneous or multiple ICHs. However, Uno *et al*¹⁴ encountered only nine cases between May 1976 and December 1989. Between January 1990 and November 2002, Shiomi *et al*¹⁵ evaluated 1069 cases of primary hypertensive ICH; only 11 cases presented with simultaneous haemorrhages—a figure that constituted 1% of their cases.

The locations of our patient's haematomas were putamenal and cerebellar. According to Shiomi *et al*,¹⁵ this combination is the most common as five out of their eleven cases had such haematomas; the rest were in the pons and basal ganglia in four patients and subcortical and basal ganglia in another two cases. When simultaneous supra- and infratentorial haematomas develop, Uno *et al*¹⁴ found that the commonest site for the infratentorial haematomas was the

cerebellum and that the putamen was the main target for supratentorial haematomas.

The available literature^{12–16} does not mention whether the right side of the brain is more commonly involved than the left one, and whether the haematomas are usually ipsilateral or contralateral to each other. In addition, there were no characteristic initial symptoms or neurological signs that might suggest which haemorrhage had occurred first; the only exception was that prominent initial cerebellar symptoms and signs might indicate that the initial haemorrhage was the cerebellar one, as in our patient.

As for the possible mechanism behind the development of simultaneous/multiple hypertensive haemorrhages, Tanno *et al* and Shiomi *et al*^{13 15} suggested that the bleeding might have occurred simultaneously in different regions of the brain, or that the initial bleeding was followed after a short time by a secondary one at another site due to high intracranial pressure and circulatory disturbance.

Our patient's putamenal haematoma was relatively large while the cerebellar one was fortunately small and deep and did not compress the fourth ventricle or the brainstem. According to Shiomi *et al*,¹⁵ the surgical treatment for multiple haematomas should be determined by the location and maximum axis of the haematoma and he proposed that cerebellar haematomas should be removed if the supratentorial haematoma is small. This is consistent with Uno's

Figure 4 Brain CT of the patient with no contrast 5 days after admission. The cerebellar haematoma is surrounded by mild oedema; however, the fourth ventricle is not compressed and no hydrocephalus occurred.

opinion¹⁴ who suggested that haematoma evacuation is necessary when the cerebellar haematoma is bigger than the supratentorial one.

In general, the prognosis is poor both short-term and long-term.¹³ However, if the neurological grading is 1–3 at the time of presentation, the outlook is usually good whether conservative or surgical treatments were used; if this grading is 4–5, the prognosis becomes poor no matter which treatment modality is used.¹⁴

Learning points

- ▶ Simultaneous hypertensive ICHs are rare but carry a considerable morbidity and mortality.
- ▶ The haematomas may develop at the same time due simultaneous rupture of Charcot-Bouchard micro-aneurysms in different places of the brain, or one haematoma develops and is followed by the other one after a short time.
- ▶ It is difficult to decide which haematoma was the very first one.
- ▶ Haematoma evacuation is necessary when the cerebellar haematoma is bigger than the supratentorial one.
- ▶ In general, the outlook is poor in most patients.

Competing interests None.

Patient consent Obtained.

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